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Price

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(54) **FOLDING LADDER**

(76) Inventor: **Harold E. Price**, 335 Prospectdale Rd., Pearisburg, VA (US) 24134-2629

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(52) **U.S. Cl.** **182/162**; 182/160
(58) **Field of Search** 182/96, 159, 162, 182/160, 25; 16/366, 371, 374

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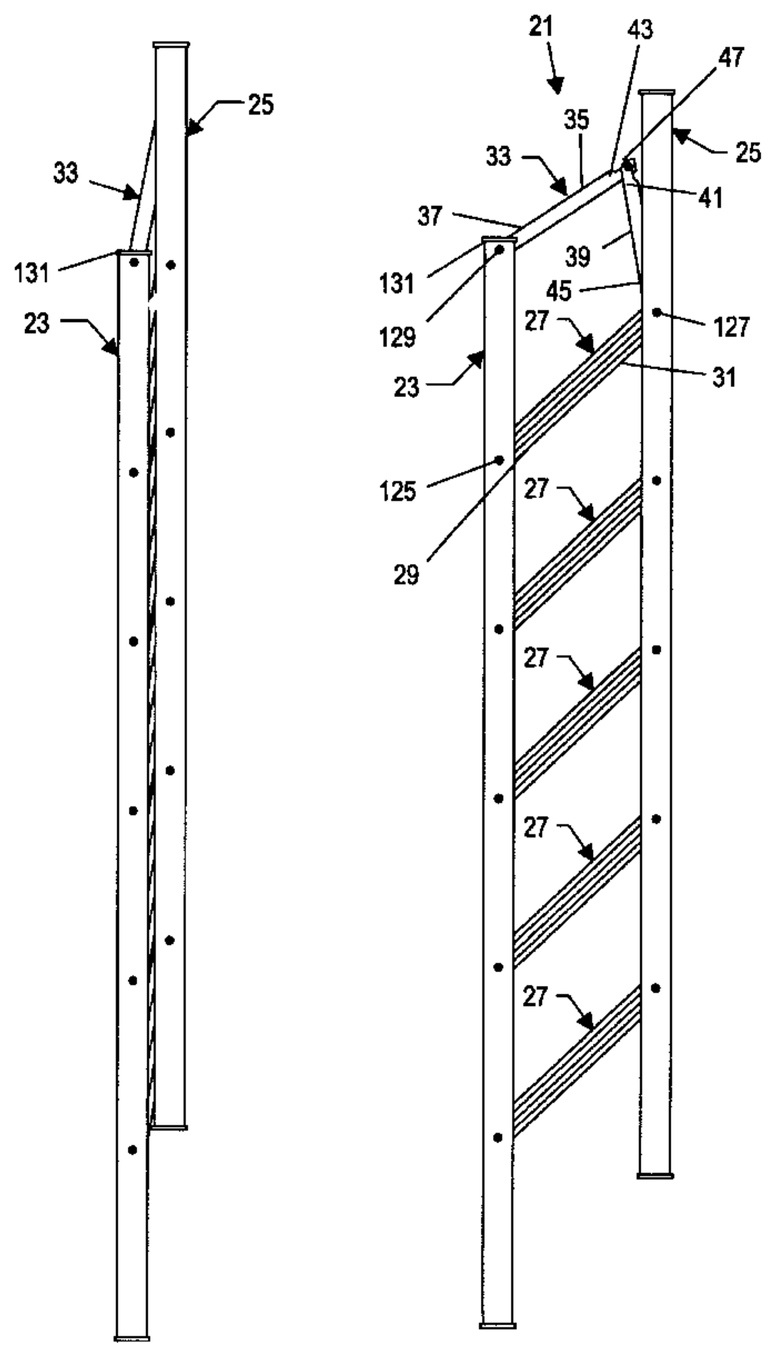
Primary Examiner—Daniel P. Stodola
Assistant Examiner—Hugh B. Thompson
(74) *Attorney, Agent, or Firm*—Burns, Doane, Swecker & Mathis, LLP

(57) **ABSTRACT**

A folding ladder includes a first side rail and a second side rail, and at least one rung pivotally attached at its ends to the first and second side rails. The ladder further includes at least one diagonal locking member having a first portion pivotally attached at a first end to the first side rail and a second portion pivotally attached at a first end to a second end of the first portion and a second end pivotally attached to the second side rail. The locking member locks the folding ladder in a use position.

19 Claims, 10 Drawing Sheets



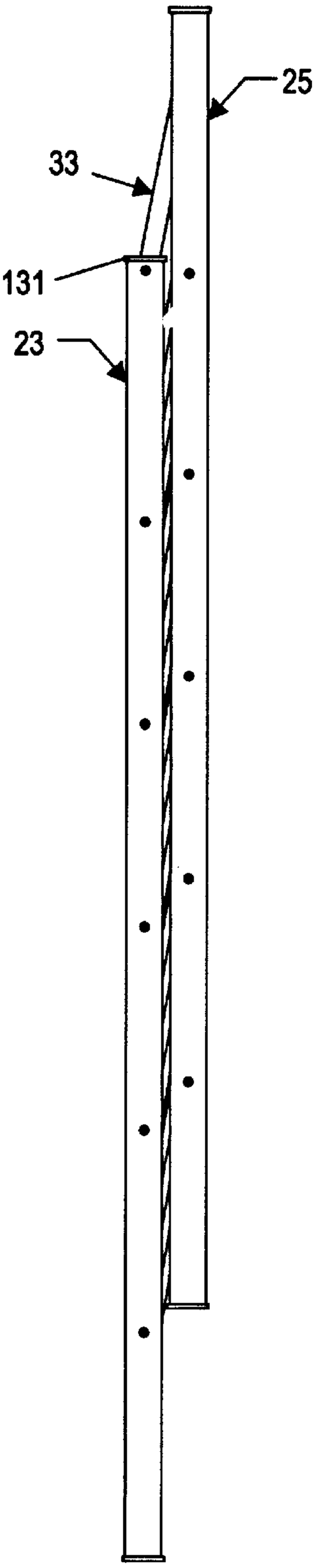


Fig. 1A

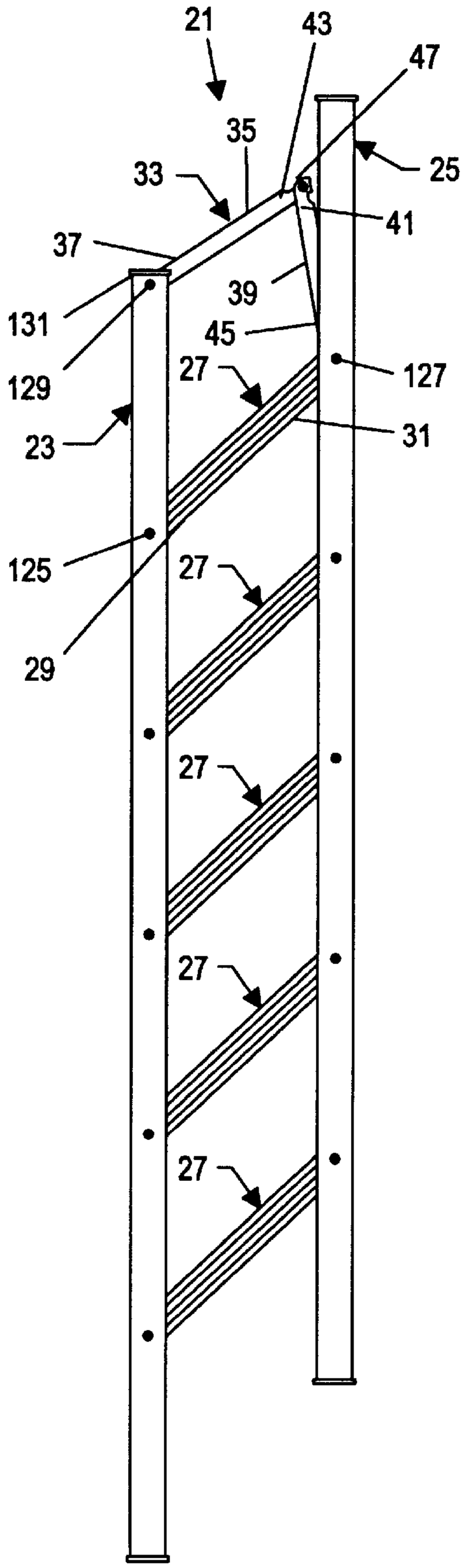


Fig. 1B

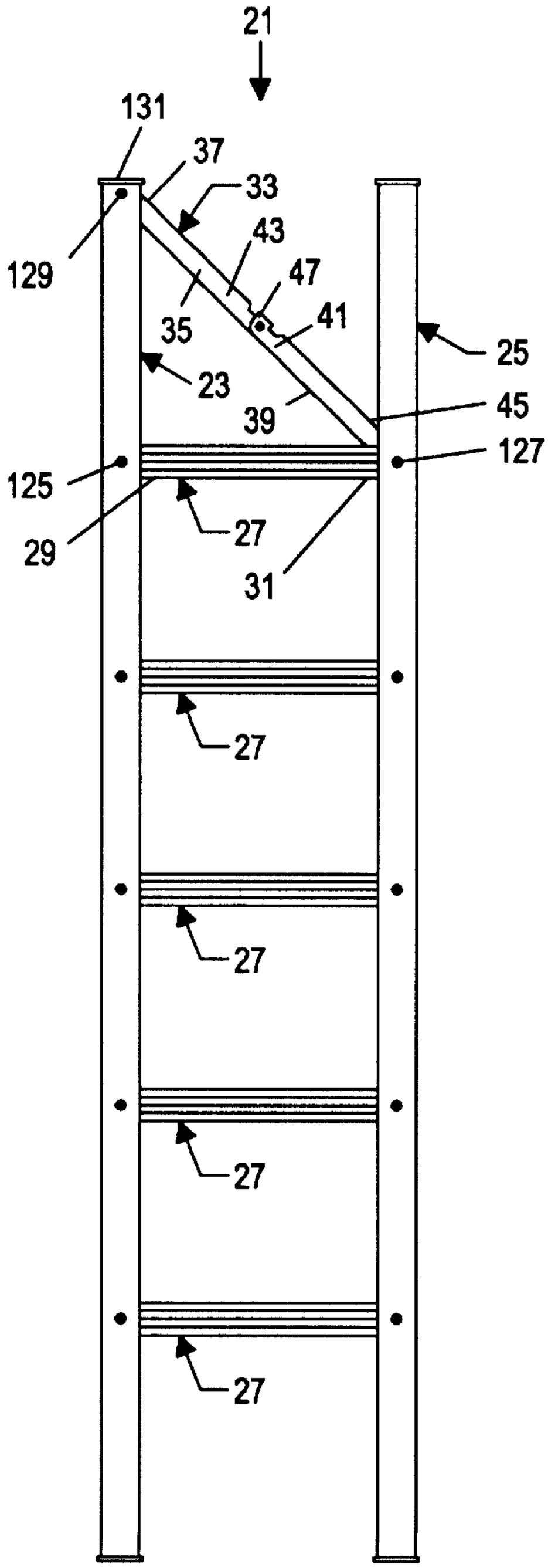
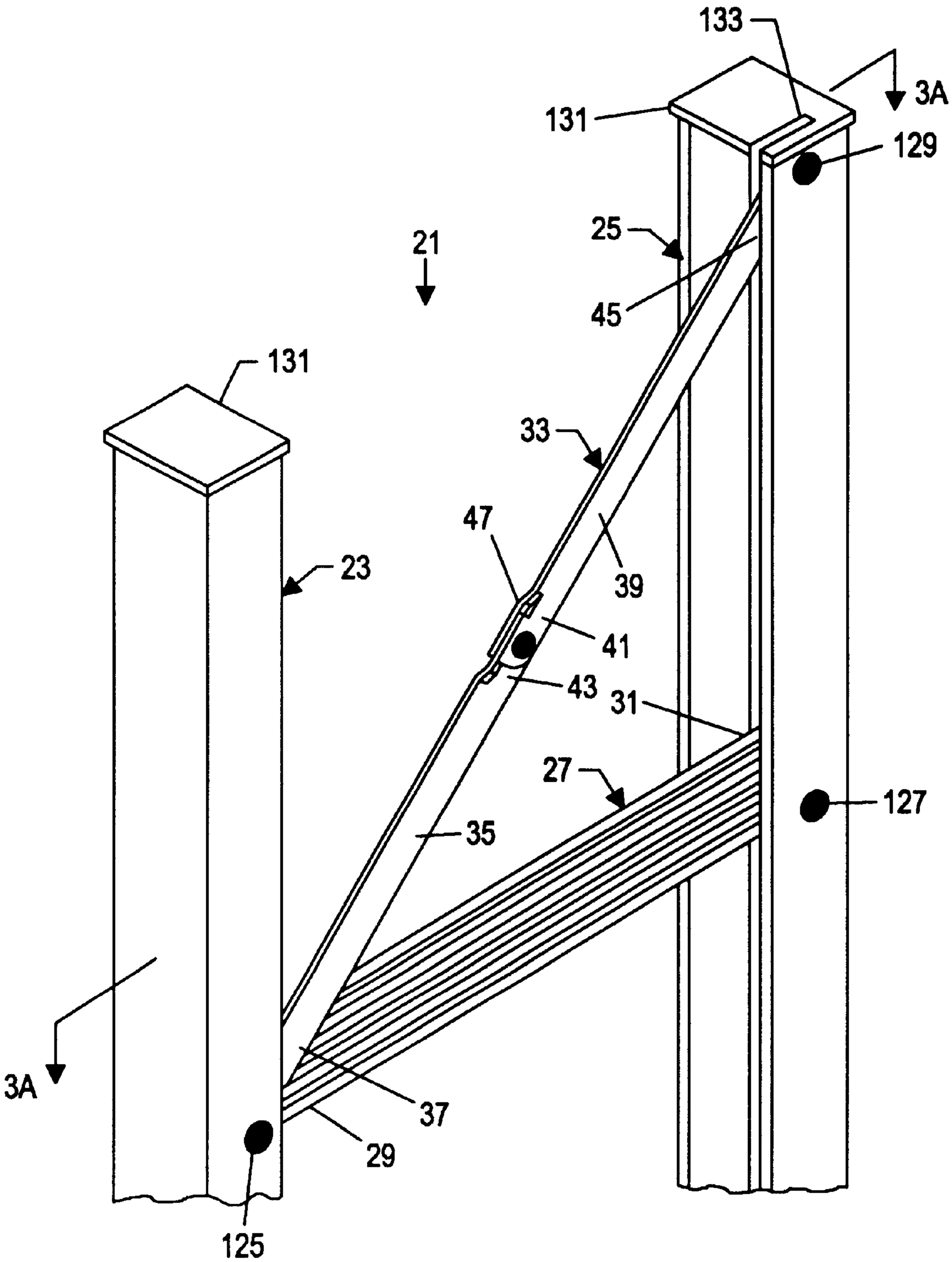


Fig. 1C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131
3A
129
25
21
45
131
33
47
23
39
41
43
31
27
127
35
3A
37
29
125

Fig. 2

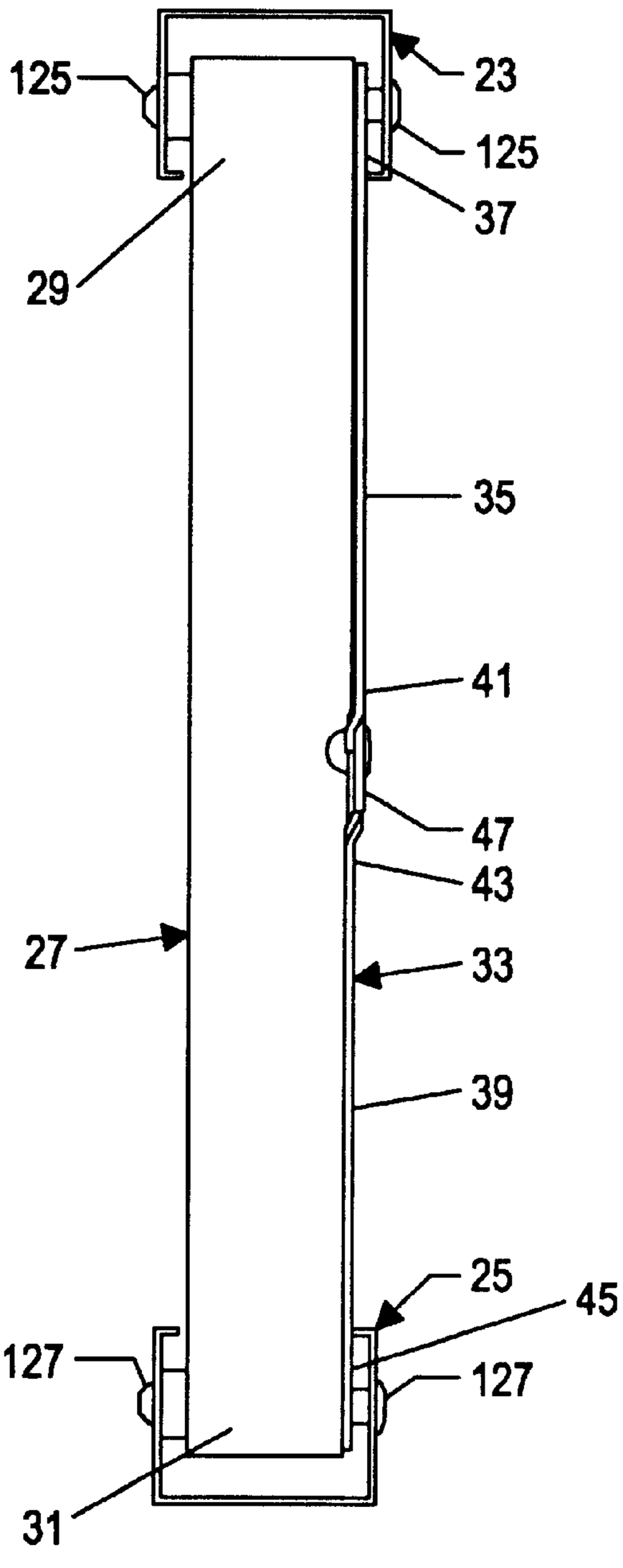


Fig. 3A

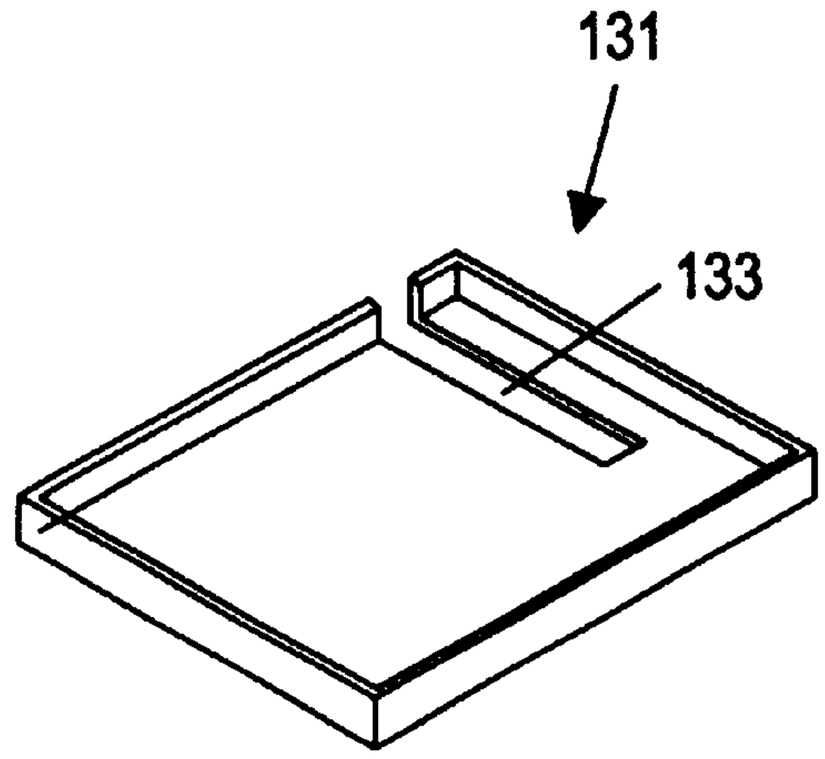
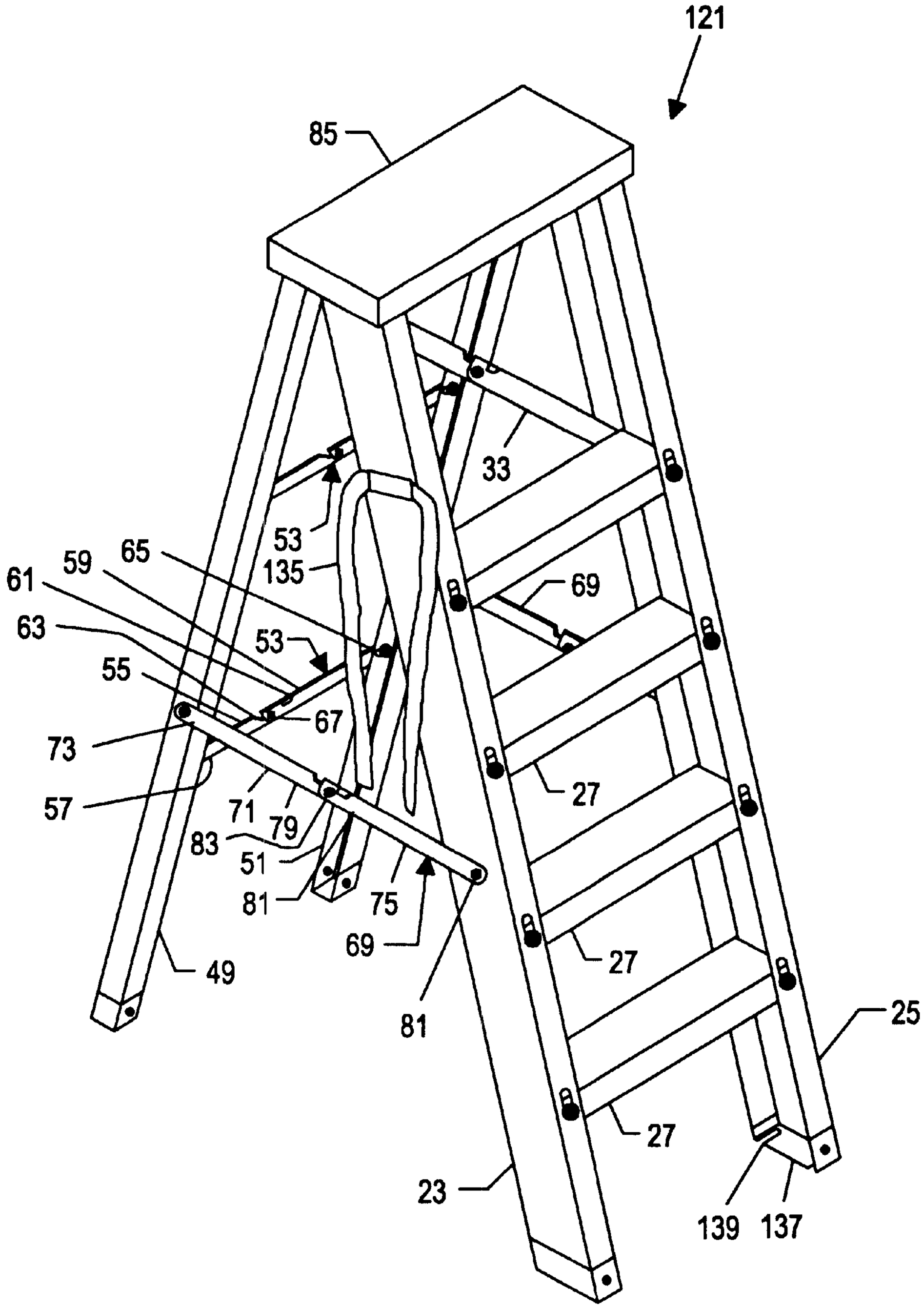


Fig. 3B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33
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135
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53
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73
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83
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81
75
69
81
69
27
27
27
25
23
49
139
137

Fig. 4A

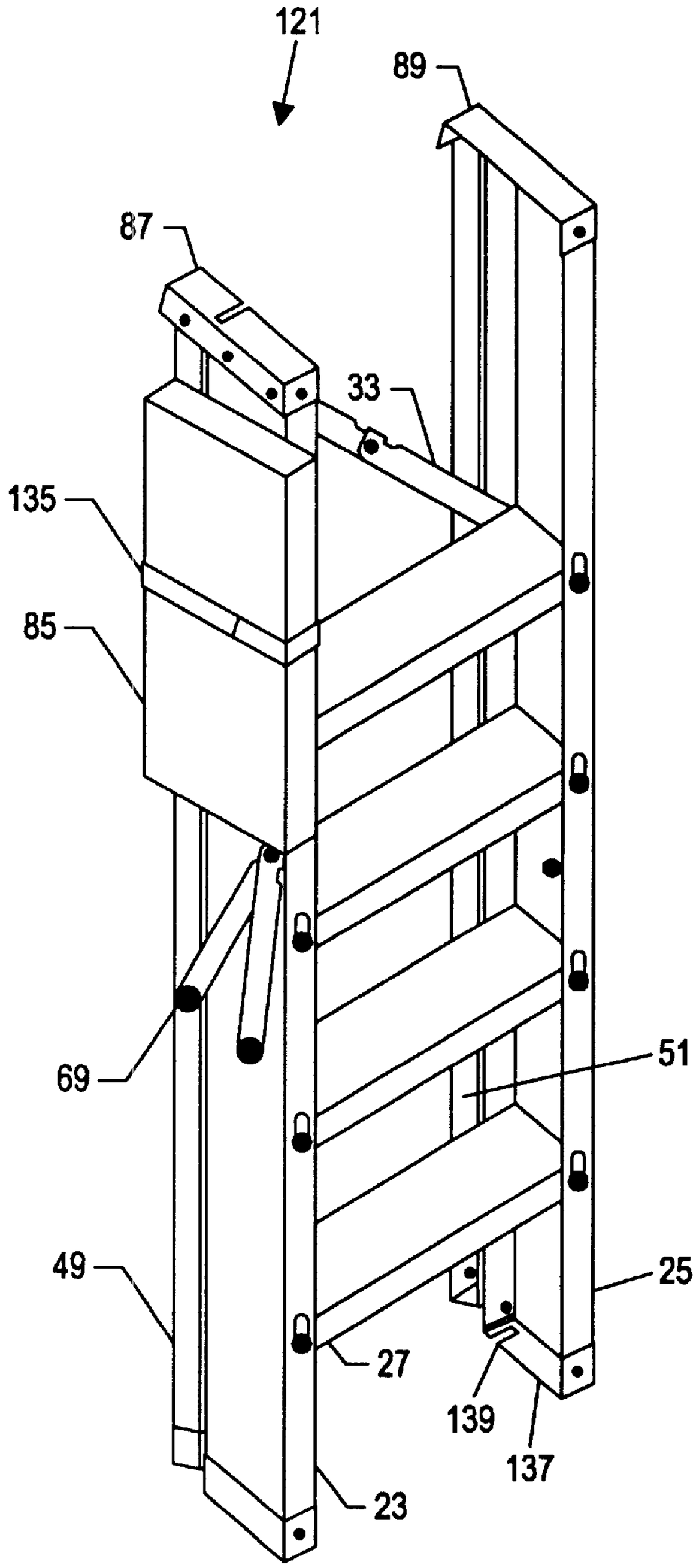
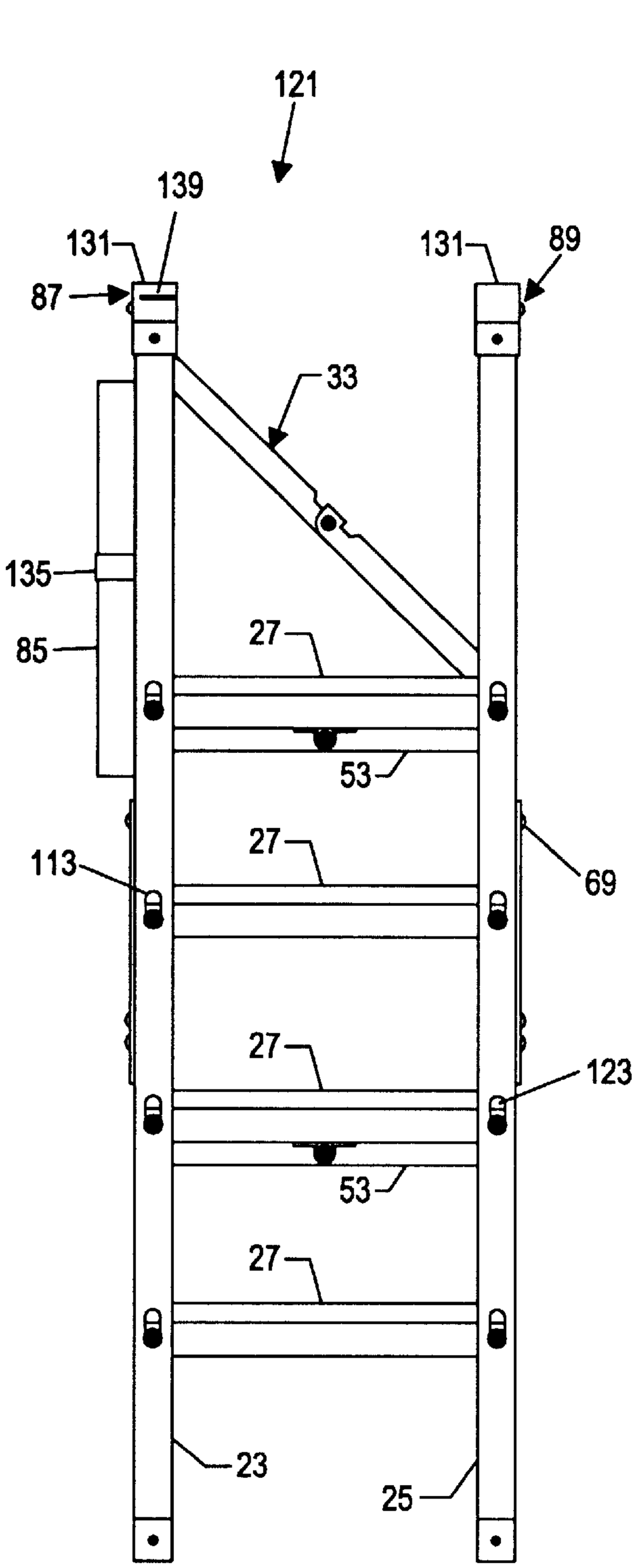


Fig. 4B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139
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87
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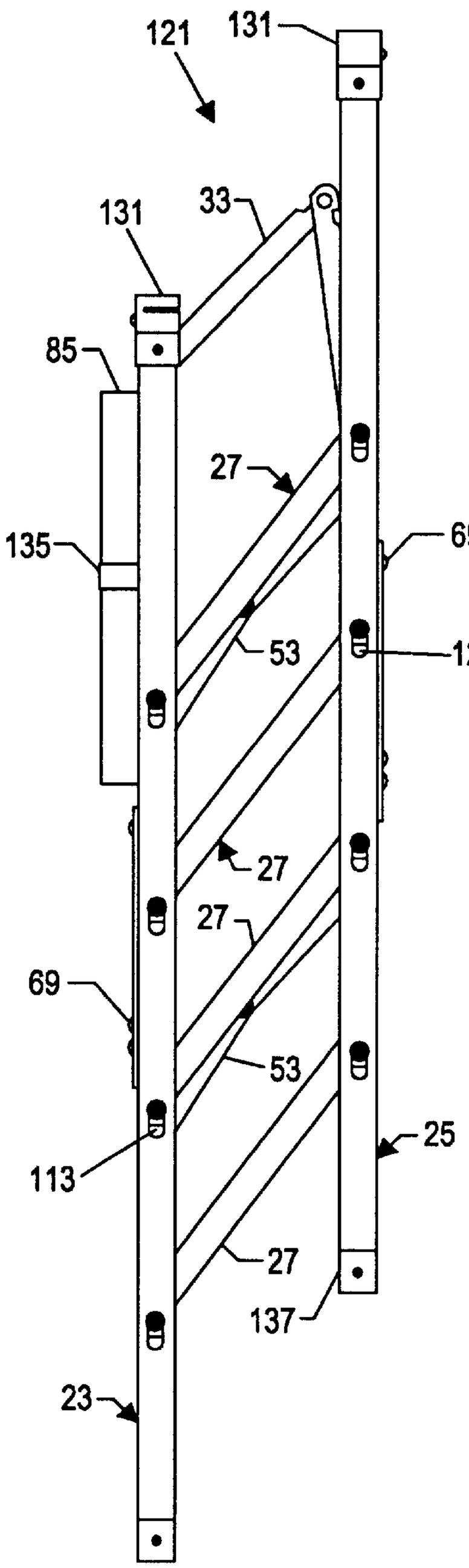
Fig. 5A


121
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137
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Fig. 5B

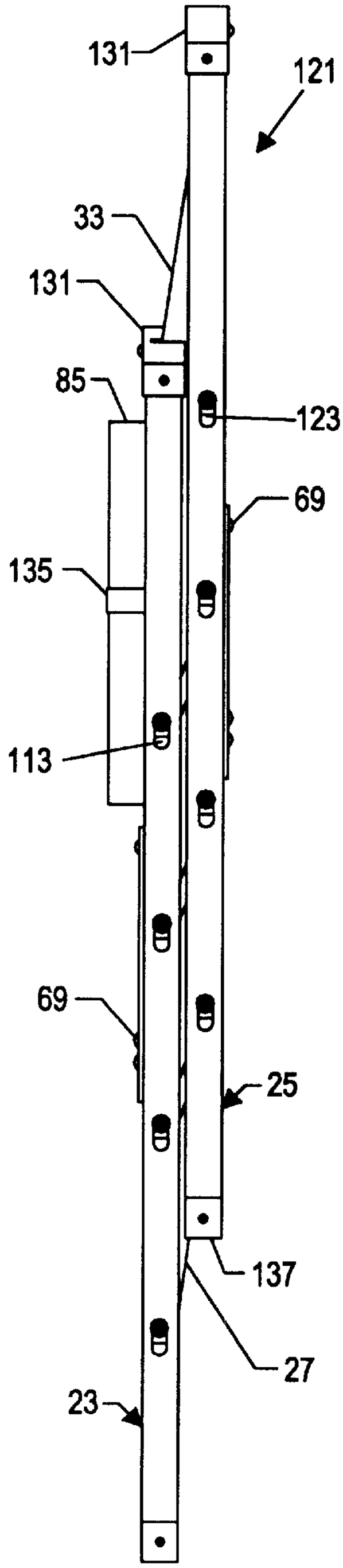
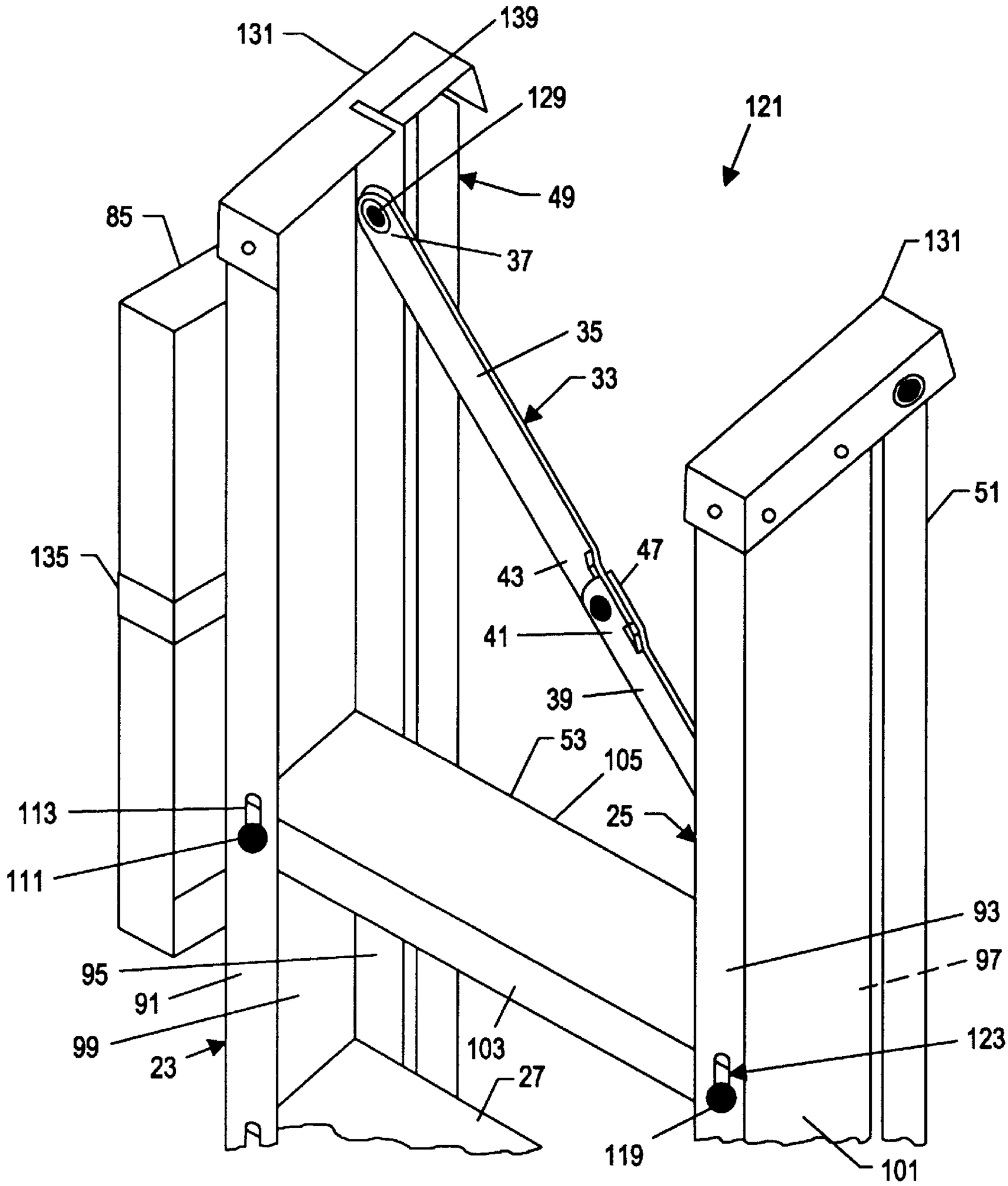


Fig. 5C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91
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103
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23
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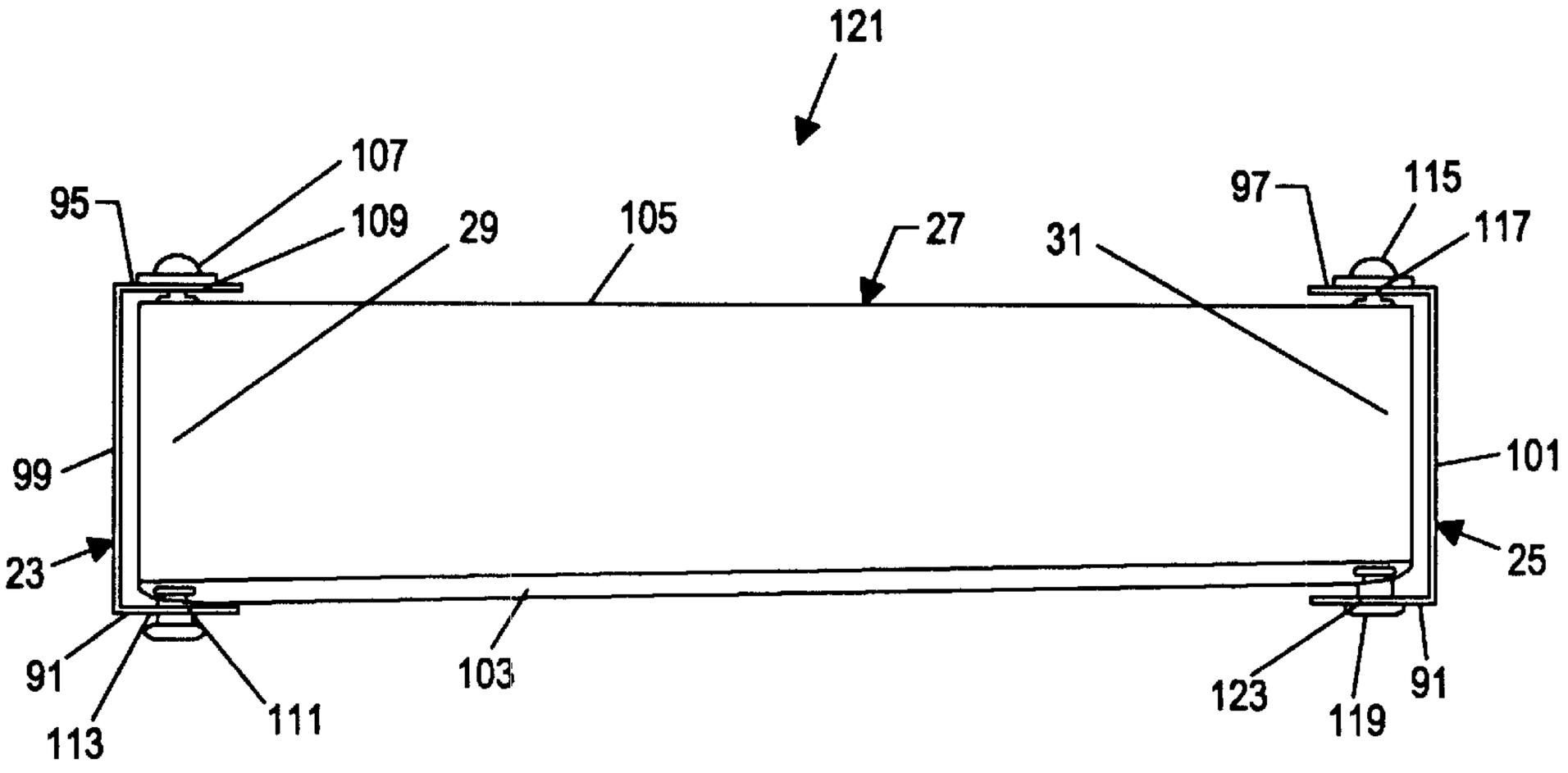
119
101

Fig. 6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107
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109
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111
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119
91

Fig. 7A

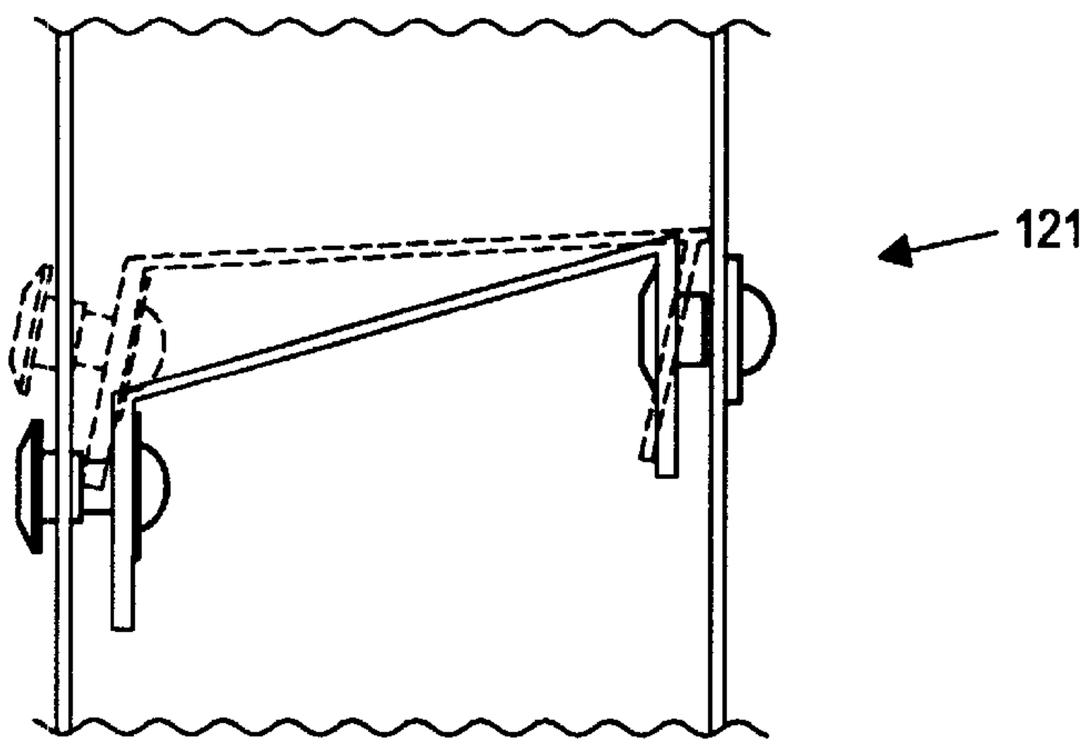
121

Fig. 7B

FOLDING LADDER

The present invention relates to a folding ladder and, more particularly, to a ladder that is laterally foldable.

Conventional straight ladders and step ladders have left and right side rails and one or more, usually a plurality, of rungs rigidly attached between the side rails. Such conventional ladders occupy a substantial amount of space due to the large open spaces between the rungs and the rails.

Step ladders typically include legs that are pivotally attached to top ends of the side rails so that, when the step ladder is not in use, the legs can be folded to a position in which they are substantially adjacent to and parallel with the side rails. However, the step ladder still occupies a substantial amount of space due to the large open spaces between the rungs and the rails.

Various attempts have been made to provide a ladder that can be laterally folded so that the rungs are substantially parallel to the legs and, when the ladder is not in use, it does not occupy as much space as when in use. U.S. Pat. No. 4,463,829, for example, discloses a foldable ladder having an arrangement of parallel rails with pivotally connected rungs. A ladder of this type can be folded to a dimension that is a fraction of that of the ladder in the unfolded condition.

One drawback to the use of foldable ladders is that they tend to be lacking in stability. It is, therefore, desirable to provide a foldable ladder that is highly stable when in an open condition.

According to one aspect of the present invention, a folding ladder includes a first side rail and a second side rail, and at least one rung having a first end portion and a second end portion, the first end portion being pivotally attached to the first side rail and the second end portion being pivotally attached to the second side rail, the rung being pivotable relative to the first side rail and the second side rail between a use position in which the rung is substantially perpendicular to each of the first side rail and the second side rail and a closed position in which the rung is substantially parallel to each of the first side rail and the second side rail. The ladder further includes at least one diagonal locking member having a first portion pivotally attached at a first end to the first side rail and a second portion pivotally attached at a first end to a second end of the first portion and a second end pivotally attached to the second side rail, the first portion and the second portion being in a substantially parallel closed position when the rung is in the closed position and being pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other and non-perpendicular to the first side rail and the second side rail when the rung is in the use position, the locking member including a stop disposed on at least one of the first portion and the second portion for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention are well understood by reading the following detailed description in conjunction with the drawings in which like numerals indicate similar elements and in which:

FIGS. **1**A, **1**B, and **1**C are front views of a foldable ladder according to an first embodiment of the present invention showing the ladder in a closed position, an intermediate position, and a use position, respectively;

FIG. **2** is a perspective view of a portion of a foldable ladder according to the first embodiment of the present invention;

FIG. **3**A is a top view of a foldable ladder according to the first embodiment of the present invention;

FIG. **3**B is a perspective view of a slotted cap according to an embodiment of the present invention adapted for use with a foldable ladder according to the present invention;

FIGS. **4**A and **4**B are perspective views of a foldable step ladder according to a second embodiment of the present invention showing the ladder in a use position and a closed position, respectively;

FIGS. **5**A, **5**B, and **5**C are front views of a foldable ladder according to the second embodiment of the present invention showing the ladder in a use position, an intermediate position, and a closed position, respectively;

FIG. **6** is a perspective view of a portion of a foldable ladder according to the second embodiment of the present invention;

FIG. **7**A is a top view of a foldable ladder according to the second embodiment of the present invention; and

FIG. **7**B is a side, partially cross-sectional view of a portion of a foldable ladder according to an embodiment of the present invention.

DETAILED DESCRIPTION

A folding ladder **21** according to an embodiment of the present invention is shown in FIGS. **1**A–**3**A. The ladder **21** includes a first side rail **23** and a second side rail **25**. The ladder also includes at least one rung **27**, preferably a plurality of rungs. Each rung **27** has a first end portion **29** and a second end portion **31**. The first end portion **29** is pivotally attached to the first side rail **23** and the second end portion **31** is pivotally attached to the second side rail **25**. The rung **27** is pivotable relative to the first side rail **23** and the second side rail **25** between a use position (FIG. **1**C) in which the rung is substantially perpendicular to each of the first side rail and the second side rail and a closed position (FIG. **1**A) in which the rung is substantially parallel to each of the first side rail and the second side rail.

As seen in FIG. **2**, the ladder **21** also includes at least one diagonal locking member **33** having a first portion **35** pivotally attached at a first end **37** to the first side rail **23** and a second portion **39** pivotally attached at a first end **41** to a second end **43** of the first portion **35** and a second end **45** pivotally attached to the second side rail **25**. The first portion **35** and the second portion **39** are in a substantially parallel closed position when the rung **27** is in the closed position (FIG. **1**A) and are pivotable relative to each other to a locking position (FIGS. **1**C and **2**) in which the first portion and the second portion are substantially parallel to each other and non-perpendicular to the first side rail **23** and the second side rail **25** when the rung is in the use position. The locking member **33** includes a stop **47** disposed on at least one of the first portion **35** and the second portion **39** for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position.

The stop **47** may be in any suitable form, such as a bent or attached portion on the first portion **35** and/or the second portion **39**, or a separate member such as a U-shaped member having legs between which each of the first portion **35** and the second portion **39** are pinned. Various stops suitable for use in connection with the present invention are frequently used on conventional step ladders and need not be discussed further here. The stop **47** preferably permits the first portion **35** and the second portion **39** to pivot relative to each other slightly past the point at which the first and the second portion are perfectly parallel to each other. In this

way, when the ladder **21** is in the use position, when the ladder is under load the first portion and the second portion will be urged to pivot further past the point at which they are stopped by the stop, as opposed to back to a closed position.

The embodiment of the ladder **21** shown in FIGS. **1A–3A** is a straight ladder. However, the structures described above are equally applicable to other types of ladders, such as step ladders. A step ladder **121** according to a second embodiment of the present invention is shown in FIGS. **4A–7B** and preferably includes all of the features of the straight ladder **21** described above in connection with FIGS. **1A–3A**.

As seen in FIGS. **4A** and **6**, in the step ladder **121**, the first side rail **23** is pivotally connected to a first back leg **49** and the second side rail **25** is pivotally connected to a second back leg **51**. As seen in FIG. **4A**, at least one leg locking member **53** having a first portion **55** pivotally attached at a first end **57** to the first back leg **49** and a second portion **59** pivotally attached at a first end **61** to a second end **63** of the first portion and a second end **65** pivotally attached to the second back leg **51** is provided. The first portion **55** and the second portion **59** are in a substantially parallel closed position when the rung **27** is in the closed position. The first portion **55** and the second portion **59** are pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other and substantially perpendicular to the first side rail **23** and the second side rail **25** when the rung is in the use position.

The leg locking member **53** includes a stop **67** disposed on at least one of the first portion **55** and the second portion **59** for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position. The stop **67** is preferably any suitable one of the suitable stops usable as the stop **47**.

As seen in FIGS. **4A** and **4B**, the ladder **121** preferably also includes at least one side locking member **69** having, as seen in FIG. **4A**, a first portion **71** pivotally attached at a first end **73** to the first back leg **49** and a second portion **75** pivotally attached at a first end **77** to a second end **79** of the first portion and a second end **81** pivotally attached to the first side rail **23**. The first portion **71** and the second portion **75** are preferably in a substantially parallel closed position when the rung **27** is in the closed position. The first portion **71** and the second portion **75** are preferably pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other when the rung **27** is in the use position.

The side locking member **69** includes a stop **83** disposed on at least one of the first portion **71** and the second portion **75** for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position. The stop **83** is preferably any suitable one of the suitable stops usable as the stop **47**.

The ladder **121** preferably also includes a top shelf **85** adapted to be removably disposed over and extend between top ends **87** and **89** of the first side rail **23** and the second side rail **25** when the rung **27** is in the use position. The top shelf **85** is preferably provided with a recessed area for receiving the top ends **87** and **89** and preferably restrains the ladder so that the rung **27** will not be caused to move to the closed position when the top ends are disposed in the recess.

As seen in FIGS. **6**, **7A**, and **7B**, the first side rail **23** and the second side rail **25** are each preferably U-shaped and open toward each other. As seen in FIG. **7A**, each of the first side rail **23** and the second side rail **25** includes a front leg **91**, **93**, respectively and a rear leg **95**, **97**, respectively, connected by a web **99**, **101**, respectively. The rung **27** has a front side **103** and a rear side **105**. The first end portion **29** of the rung **27** is pivotally attached to the first side rail **23** by a first rear pin **107** extending from the rear side **105** of the rung and through a first hole **109** in the rear leg **95** of the first side rail and by a first front pin **111** extending from the front side **103** of the rung and through a first longitudinal slot **113** (FIG. **6**) in the front leg **91** of the first side rail. The second end portion **31** of the rung **27** is pivotally attached to the second side rail **25** by a second rear pin **115** extending from the rear side **105** of the rung and through a second hole **117** in the rear leg **97** of the second side rail and by a second front pin **119** extending from the front side **103** of the rung and through a second longitudinal slot **123** (FIG. **6**) in the front leg **93** of the second side rail **25**.

As seen in FIG. **7B**, the rung **27** is pivotable about pivot points on the first and second rear pins **107** and **115** relative to the first side rail **23** and the second side rail **25** about an axis parallel to an axis of the rung. The rung **27** is preferably pivotable about this axis through a range of motion wherein, when the rung is in the use position, the first front pin **111** and the second front pin **119** are adapted to be disposed at bottoms of the first longitudinal slot **113** and the second longitudinal slot **123**, respectively. When the rung **27** is in the closed position, the first front pin **111** and the second front pin **119** are preferably disposed at tops of the first longitudinal slot **113** and the second longitudinal slot **123**, respectively. The tops of the first longitudinal slot **113** and the second longitudinal slot **123** are preferably disposed at substantially the same heights on the first side rail **23** and the second side rail **25** as the first hole **109** and the second hole **117**, respectively.

Preferably, when the rung **27** is in the use position and the ladder **21** is upright, gravity causes the rung to pivot so that the first front pin **111** and the second front pin **119** are disposed at bottoms of the first longitudinal slot **113** and the second longitudinal slot **123**, respectively. Further, when the first front pin **111** and the second front pin **119** are disposed at bottoms of the first longitudinal slot **113** and the second longitudinal slot **123**, respectively, the first front pin and the second front pin are disposed vertically below the first rear pin **107** and the second rear pin **115** on the first side rail **23** and the second side rail **25**. This slight offset preferably results in interference between the rung **27** and the first side rail **23** and the second side rail **25**, such that pivoting of the rung from the use position is restrained. In addition to being used in step ladders, the rung **27** that is pivotable about an axis parallel to a longitudinal axis of the rung may be used in other types of ladders, such as straight ladders, if desired or necessary.

An alternative form of arrangement for the rung **27** is shown in FIGS. **1A–3A**. Preferably, the first side rail **23** and the second side rail **25** are each U-shaped and open toward each other. The first end portion **29** of the rung **27** is pivotally pinned between the front leg **91** and the rear leg **95** of the first side rail **23** and the second end portion **31** is pivotally pinned between front leg **93** and the rear leg **97** of the of the second side rail **25**. The rung **27** may be any suitable shape, such as U-shaped, circular in cross-section, or square or rectangular in cross-section. Preferably, the first end portion **29** of the rung **27** is pivotally pinned between the front leg **91** and the rear leg **95** of the first side rail **23** by a first pin **125** and the second end portion **31** is pivotally pinned between front leg **93** and the rear leg **97** of the of the second side rail **25** by a second pin **127**. Preferably, the first end **37** of the first portion **35** of the diagonal locking member **33** is pivotally attached to the first side rail **23** by the first pin

125 and the second end 45 of the second portion 39 of the diagonal locking member is pivotally attached to the second side rail 25 by a third pin 129 disposed above the second pin 127 as seen in FIGS. 2 and 3A (FIG. 3A does not show the third pin 129 for the sake of clarity) or, as seen in FIGS. 1B–1C, the diagonal locking member 33 could be disposed diagonally so that the third pin 129 is disposed above the first pin 125 and the rung 27 and the second end 45 of the second portion 39 of the diagonal locking member could both be pinned to the second rail by the second pin 127.

As seen, for example, in FIGS. 3B and 6, an end cap 131 of the side rail having the vertically higher end of the diagonal locking member 33 pivotally attached thereto may be provided with a slot 133. The slot 133 facilitates folding of the diagonal locking member 33 when the rung 27 is moved to the closed position, e.g., as seen in FIGS. 1A–1C and FIGS. 5A–5C where, otherwise the end cap might interfere with the diagonal locking member 33 pivoting to a position in which the first and second portions 35 and 39 of the diagonal locking member are substantially parallel to the first and second side rails 23 and 25.

As seen in FIGS. 4A and 4B, a bottom end cap 137 for a bottom end of at least one of the first and second side rails 23 and 25 may be provided with slots 139 for receiving legs of the rung 27 when the rung is a U-shaped member. The slots 139 facilitate folding such a rung 27 to the closed position in which it is substantially parallel to the first and second side rails 23 and 25. If a rung 27 having a cross-sectional shape other than U-shaped, e.g., circular, rectangular, square, etc. is used, a suitable slot for receiving the rung can be formed in the bottom end cap.

As seen in FIGS. 4A and 4B, a cord or strap 135 is preferably fastened to the ladder 21 at a suitable location so that, when the ladder is folded so that the rung 27 is in the closed position, the cord can be used to tie up the ladder and keep it folded. When the ladder has a removable shelf 85, the cord 135 may also be used to secure the shelf 85 relative to the ladder.

The foregoing embodiments all show the diagonal locking member 33 at a top end of the ladder 21. While this is presently believed to be a convenient location for the diagonal locking member 33, it will be appreciated that the diagonal locking member can be located at any desired, convenient location on the ladder. In addition, while the illustrated embodiments show only a single diagonal locking member 33, the ladder may have a plurality of diagonal locking members, if desired or necessary.

While this invention has been illustrated and described in accordance with a preferred embodiment, it is recognized that variations and changes may be made therein without departing from the invention as set forth in the claims.

What is claimed is:

1. A folding ladder, comprising:

a first side rail and a second side rail,

at least one rung having a first end portion and a second end portion, the first end portion being pivotally attached to the first side rail and the second end portion being pivotally attached to the second side rail, the rung being pivotable relative to the first side rail and the second side rail between a use position in which the rung is substantially perpendicular to each of the first side rail and the second side rail and a closed position in which the rung is substantially parallel to each of the first side rail and the second side rail; and

at least one diagonal locking member having a first portion pivotally attached at a first end to the first side rail and a second portion pivotally attached at a first end to a second end of the first portion, the first end of the second portion and the second end of the first portion defining a central pivot point, and a second end pivotally attached to the second side rail, the first end of the first portion and the second end of the second portion defining first and second end pivot points, respectively, the first portion and the second portion being in a substantially parallel closed position with the central pivot point being disposed above the first and second end pivot points when the rung is in the closed position and being pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other and non-perpendicular to the first side rail and the second side rail and the central pivot point is disposed below one of the first and second end pivot points and above the other one of the first and second end pivot points when the rung is in the use position, the locking member including a stop disposed on at least one of the first portion and the second portion for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position.

2. The folding ladder according to claim 1, wherein the ladder includes a plurality of rungs.

3. The folding ladder according to claim 1, wherein the ladder is a straight ladder.

4. The folding ladder according to claim 1, wherein the ladder is a step ladder.

5. The folding ladder according to claim 4, wherein the first side rail is pivotally connected to a first back leg and the second side rail is pivotally connected to a second back leg, and wherein at least one leg locking member having a first portion pivotally attached at a first end to the first back leg and a second portion pivotally attached at a first end to a second end of the first portion and a second end pivotally attached to the second back leg, the first portion and the second portion being in a substantially parallel closed position when the rung is in the closed position and being pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other and substantially perpendicular to the first side rail and the second side rail when the rung is in the use position, the leg locking member including a stop disposed on at least one of the first portion and the second portion for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position.

6. The folding ladder according to claim 5, wherein at least one side locking member having a first portion pivotally attached at a first end to the first back leg and a second portion pivotally attached at a first end to a second end of the first portion and a second end pivotally attached to the first side rail, the first portion and the second portion being in a substantially parallel closed position when the rung is in the closed position and being pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other when the rung is in the use position, the side locking member including a stop disposed on at least one of the first portion and the second portion for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position.

7. The folding ladder according to claim 4, further comprising a top shelf adapted to be removably disposed over and extend between top ends of the first side rail and the second side rail when the rung is in the use position.

8. The folding ladder according to claim 1, wherein the first side rail and the second side rail are each U-shaped and open toward each other, each of the first side rail and the second side rail including a front leg and a rear leg connected by a web, and wherein the first end portion of the rung is pivotally pinned between the front leg and the rear leg of the first side rail and the second end portion is pivotally pinned between front leg and the rear leg of the second side rail.

9. The folding ladder according to claim 8, wherein the first end portion of the rung is pivotally pinned between the front leg and the rear leg of the first side rail by a first pin and the second end portion is pivotally pinned between front leg and the rear leg of the of the second side rail by a second pin, and the first end of the first portion of the diagonal locking member is pivotally attached to the first side rail by the first pin.

10. A folding ladder, comprising:

a first side rail and a second side rail,

at least one rung having a first end portion and a second end portion, the first end portion being pivotally attached to the first side rail and the second end portion being pivotally attached to the second side rail, the rung being pivotable relative to the first side rail and the second side rail between a use position in which the rung is substantially perpendicular to each of the first side rail and the second side rail and a closed position in which the rung is substantially parallel to each of the first side rail and the second side rail; and

at least one diagonal locking member having a first portion pivotally attached at a first end to the first side rail and a second portion pivotally attached at a first end to a second end of the first portion and a second end pivotally attached to the second side rail, the first portion and the second portion being in a substantially parallel closed position when the rung is in the closed position and being pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other and non-perpendicular to the first side rail and the second side rail when the rung is in the use position, the locking member including a stop disposed on at least one of the first portion and the second portion for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position,

wherein the ladder is a step ladder and wherein the first side rail and the second side rail are each U-shaped and open toward each other, each of the first side rail and the second side rail including a front leg and a rear leg connected by a web, the rung has a front side and a rear side, the first end portion being pivotally attached to the first side rail by a first rear pin extending from the rear side of the rung and through a first hole in the rear leg of the first side rail and by a first front pin extending from the front side of the rung and through a first longitudinal slot in the front leg of the first side rail, and the second end portion being pivotally attached to the second side rail by a second rear pin extending from the rear side of the rung and through a second hole in the rear leg of the second side rail and by a second front pin extending from the front side of the rung and through a second longitudinal slot in the front leg of the second side rail.

11. The folding ladder according to claim 10, wherein the rung is pivotable about pivot points on the first and second rear pins relative to the first side rail and the second side rail about an axis parallel to an axis of the rung through a range of motion wherein, when the rung is in the use position, the first front pin and the second front pin are adapted to be disposed at bottoms of the first longitudinal slot and the second longitudinal slot, respectively, and, when the run is in the closed position, the first front pin and the second front pin are disposed at tops of the first longitudinal slot and the second longitudinal slot, respectively.

12. The folding ladder according to claim 11, wherein the tops of the first longitudinal slot and the second longitudinal slot are disposed at substantially the same heights on the first side rail and the second side rail as the first hole and the second hole, respectively.

13. The folding ladder according to claim 11, wherein when the rung is in the use position and the ladder is upright, gravity causes the rung to pivot so that the first front pin and the second front pin are disposed at bottoms of the first longitudinal slot and the second longitudinal slot, respectively.

14. The folding ladder according to claim 13, wherein, when the first front pin and the second front pin are disposed at bottoms of the first longitudinal slot and the second longitudinal slot, respectively, the first front pin and the second front pin are disposed vertically below the first rear pin and the second rear pin on the first side rail and the second side rail, respectively, such that pivoting of the rung from the use position is restrained.

15. A folding ladder, comprising:

a first side rail and a second side rail,

at least one rung having a first end portion and a second end portion, the first end portion being pivotally attached to the first side rail and the second end portion being pivotally attached to the second side rail, the rung being pivotable relative to the first side rail and the second side rail between a use position in which the rung is substantially perpendicular to each of the first side rail and the second side rail and a closed position in which the rung is substantially parallel to each of the first side rail and the second side rail; and

at least one diagonal locking member having a first portion pivotally attached at a first end to the first side rail and a second portion pivotally attached at a first end to a second end of the first portion and a second end pivotally attached to the second side rail, the first portion and the second portion being in a substantially parallel closed position when the rung is in the closed position and being pivotable relative to each other to a locking position in which the first portion and the second portion are substantially parallel to each other and non-perpendicular to the first side rail and the second side rail when the rung is in the use position, the locking member including a stop disposed on at least one of the first portion and the second portion for preventing the first portion and the second portion from pivoting relative to each other beyond the locking position, wherein the first side rail and the second side rail are each U-shaped and open toward each other, each of the first side rail and the second side rail including a front leg and a rear leg connected by a web, the rung has a front side and a rear side, the first end portion being pivotally attached to the first side rail by a first rear pin extending from the rear side of the rung and through a first hole in the rear leg of the first side rail and by a first front pin extending from the front side of the rung and through a first longitudinal slot in the front leg of the first side rail, and the second end portion being pivotally attached to the second side rail by a

second rear pin extending from the rear side of the rung and through a second hole in the rear leg of the second side rail and by a second front pin extending from the front side of the rung and through a second longitudinal slot in the front leg of the second side rail.

16. The folding ladder according to claim **15**, wherein the rung is pivotable about pivot points on the first and second rear pins relative to the first side rail and the second side rail about an axis parallel to an axis of the rung through a range of motion wherein, when the rung is in the use position, the first front pin and the second front pin are adapted to be disposed at bottoms of the first longitudinal slot and the second longitudinal slot, respectively, and, when the run is in the closed position, the first front pin and the second front pin are disposed at tops of the first longitudinal slot and the second longitudinal slot, respectively.

17. The folding ladder according to claim **16**, wherein the tops of the first longitudinal slot and the second longitudinal slot are disposed at substantially the same heights on the first side rail and the second side rail as the first hole and the second hole, respectively.

18. The folding ladder according to claim **15**, wherein when the rung is in the use position and the ladder is upright, gravity causes the rung to pivot so that the first front pin and the second front pin are disposed at bottoms of the first longitudinal slot and the second longitudinal slot, respectively.

19. The folding ladder according to claim **18**, wherein, when the first front pin and the second front pin are disposed at bottoms of the first longitudinal slot and the second longitudinal slot, respectively, the first front pin and the second front pin are disposed vertically below the first rear pin and the second rear pin on the first side rail and the second side rail, respectively, such that pivoting of the rung from the use position is restrained.

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